REMARKS

Upon entry of this reply, claims 27-32 will be added, so that claims 1-3, 6-8, 10, 11, 13, 15, 18 and 21-32 will be pending.

New claims 27-32 have been added to further define that the multifilament threads have a fineness of 350 to 600 dtex, which are supported in the originally filed application, such as in Applicants' specification at page 3, lines 8-12. Accordingly, these claims should not be considered to include new matter.

Reconsideration and allowance of the application are respectfully requested.

Information Disclosure Statements

Applicants are submitting on even date herewith a Supplemental Information Disclosure Statement to make a Protest in the counterpart European application and documents cited in the Protest of record in the present application.

The Examiner is requested to include an initialed copy of the Form PTO-1449 with the next communication from the Patent and Trademark Office so that the Examiner's consideration of the Supplemental Information Disclosure Statement and the documents cited therein will be of record.

Response To Art Based Rejections

The following rejections are set forth in the Office Action.

(a) Claims 1-3, 7, 8, 10, 11, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over US 2002/0074068 to Howland and further in view of JP 60-28538 to Tyobo and DE 2905136 to Loose.

(b) Claims 1-3, 7, 10, 11, 13 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 4,649,979 to Kazusa in view of Howland, Tyobo and Loose.

(c) Claims 6, 18 and 21-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kazusa, Howland, Tyobo and Loose as applied to claims 1 and 2, and further in view of JP 64-60402 to Miyamoto.

Applicants note that claim 1 is directed to a bicycle tire comprising:

a carcass;

a tread rubber;

one reinforcement layer in the tire, the one reinforcement layer containing strength supports comprising multifilament threads of more than 30 polyester/polyarylate filaments and having a fineness of 200 to 950 dtex, the filaments being spun from molten liquid-crystal polymer, arranged between the carcass and the tread rubber and/or between carcass layers below the tread rubber and/or within the tread rubber; and

the multifilament threads being present in the one reinforcement layer as threads running parallel to one another and not intersecting with a thread count of 130 to 480 threads per 10 cm.

Applicants respectfully submit that any combination of prior art utilized in the rejections of record does not teach or suggest this claimed subject matter or the subject matter as further recited in Applicants' dependent claims. Applicants once again emphasize that an advantage of the present invention is surprisingly a high resistance to puncturing is obtained while having a low weight and thus a lower rolling resistance. See, for example, Applicants' specification at page 2, line 4-13. Therefore, not only is a *prima facie* case of obviousness not established, but Applicants' claimed subject matter provides unexpected advantages.

In particular, Applicants' originally filed application discloses:

> Surprisingly, with bicycle tires with these multifilament threads in the reinforcement layer, a much higher resistance to perforation can be obtained than with other threads with the same or similar layer construction (same thread count, same number of layers). A high resistance to perforation can also be achieved if there is a lower thread count of the thread within a reinforcement layer than is conventional or if fewer reinforcement layers, e.g., only one reinforcement layer, are used. This has the advantage that, even with high resistance to puncturing, the bicycle tire still has a low weight and thus a lower rolling resistance. In addition, multifilament threads with more than 30 filaments provide a high fatigue resistance.

The rejections once again primarily contend that Howland discloses VECTRAN® which is asserted to be analogous to Applicants' recited polyester/polyarylate filaments. The rejections state that Howland and Kazusa fail to expressly describe the specific makeup of the reinforcing elements. However, the rejections contend that the claimed fineness, thread count, and thread number (number of filaments per thread) are consistent with commonly used reinforcing elements in the tire industry, as shown for example by Tyobo (Abstract) and Loose (Abstract). The rejections contend that the claims define broad ranges for each of the parameters and applicant has not provided a conclusive showing of unexpected results to establish criticality for the claimed combination of characteristics.

In response, Applicants once again submit that the abstract of Tyobo merely discloses that the weft is a core yarn prepared by covering the a core yarn with non-heat fusible short fiber, and provides characteristics of the core yarn and the ratio of short fiber to core yarn. While the abstract of Tyobo does disclose that the multifilament consists of at least 10, preferably 19-50 monofilaments and has a total size of 50-300 (100-250) denier, there is no indication as to why one having ordinary skill in the art would look to the abstract of Tyobo for such disclosure or why one having ordinary skill in the art would modify Howland or Kazusa with any such

disclosure of Tyobo. In fact, it would appear that if one having ordinary skill in the art would look to Tyobo for any teaching, it would be relative to its disclosure relating to PET core yarn covered with short fiber.

Moreover, Tyobo discloses a "radial tyre carcass" whereas bicycle tires are always bias-ply tires. Moreover, the material for the breaker is a hybrid-yarn of polyethylene polyterephthalate (PET) and a unknown "short fibre" core with a high breaking elongation of 80 to 200%. There is no teaching or suggestion of molten liquid-crystal Vectran, which has a stretch of 3.5% and can therefore not be used in bias direction in bicycle tires (which are bias-ply tires). From the chemical point of view PET and Vectran are both aromatic polyesters, but with totally different chemical structure (different monomer units) and extremely different physical properties (melting point, stretch, etc). In addition, PET is not a Liquid Crystal Polymer, but a thermoplastic polymer which is usually not used in tires due to the very low glass transition point (75°C) and the very low softening point (170°C). The vulcanization temperature is about 180°C. Accordingly, for these additional reasons, there is no motivation to combine the disclosure of Tyobo with Howland.

Loose is directed to a fabric providing protection for retread, and it not seen why one having ordinary skill in the art would modify Howland or Kazusa with the disclosure of Loose.

Moreover, Loose discloses PLT or CVT tires (Passenger & Light Truck Tires or Commercial Vehicle Tires), which have totally different constructions and requirements than bicycle tires. Bicycle tires having puncture resistance is different from renewal of PLT or CVT tires as disclosed in Loose.

Therefore, if the rejections are maintained, the Examiner is respectfully requested to provide an explanation in the rejections why one having ordinary skill in the art would have modified the disclosure of Howland or Kazusa with Tyobo and Loose. In this regard, the Examiner is reminded that the combination of the prior art requires some suggestion in the prior art, and Applicants' disclosure cannot be used as a roadmap to try and arrive at Applicants' claimed subject matter.

As noted above, Applicants' independent claim I includes a number of features that permit surprising results to be achieved, and the prior art of record would not lead one having ordinary skill in the art to arrive at this combination of features, let alone the combination of features, which as disclosed by Applicants, provides surprising results.

Moreover, the rejections do not establish that one having ordinary skill in the art would include a diameter of less than 40 microns as recited in claim 2 in the modified bicycle tire of Howland or Kazusa; that lowland or Kazusa discloses a stretchable fabric as recited in Applicants' claims 7 and 8; or why one having ordinary skill in the art would include the thread count as recited in Applicants' claims 11, 13 and 15 in Howland or Kazusa.

The Office Action once again notes that with respect to Howland that VECTRAN® is a non-preferred embodiment. However, the Office Action again contends that a reference may be relied upon for all that it would have reasonably suggested to one having ordinary skill in the art, including non-preferred embodiments.

In response, Applicants once again submit that Howland is preferably directed, for reasons of low cost and low abrasion, to puncture-resistant layers comprising fibers having a tensile strength or tenacity of less than about 15 g/denier. For example, claim 1 of Howland is directed to "A tire anti-puncture device comprising: a puncture-resistant layer comprising at least

two layers of woven fabric material, each layer having a taped fiber density of at least about 80% of full in at least one of the warp and fill and comprising fibers having a tenacity of less than about 15 g/denier, wherein the puncture-resistant layer is shaped and configured to form a belt within and around the periphery a tire".

Moreover, at paragraphs [00041 and [0005], Howland discloses that puncture-resistant layers or liners have also been utilized to provide puncture resistance to tires. lowland discloses that, for example, extruded or molded strips made of various resins, but containing no fibers therein, have been utilized as puncture-resistant layers. In addition, para-ararnid felt strips made of felted fiber having a strength or tenacity of greater than 15 g/denier (gpd) have also been utilized. Howland discloses that other examples of puncture-resistant materials utilized in the prior art for providing puncture resistance to tires include Vectran™ liquid crystal polyester and/or para-aramid coated fabrics made of fibers having a strength or tenacity of greater than 15 g/denier.

Howland discloses that the extruded or molded strips utilized in the prior art tend to have relatively poor puncture resistance, while the materials formed of high tenacity fibers (i.e., having a tenacity greater than 15 gpd), while providing good puncture resistance, tend to be expensive and can cause an undesirable level of abrasion, which can damage the tire cores and/or inner tubes of the tire in which they are installed. Howland discloses that there is accordingly a need in the art for puncture-resistant materials and layers for use in tires having a desirable combination of good puncture resistance, relatively low cost, and a relatively low degree of abrasion, so as to prevent damage to the tire and/or inner tube in use.

Still further, at page 3, paragraph [0027], Howland discloses, referring to the construction of puncture-resistant layer 12, that a wide variety of fiber types can potentially be used within the

scope of the invention comprising a variety of natural and/or synthetic materials, most typically polymeric materials. Howland discloses that, for cost considerations, preferred embodiments of his invention utilize fibers and yams that are not formed of pure "high performance" fibers, such as KEVLAR™ para-aramid and VECTRAN™ liquid crystal polyesters, having a fiber strength/tenacity of greater than about 15 g/denier. Howland discloses that most preferred, within the context of his invention, are yams and fabrics containing fibers having a strength/tenacity of between about 3 and about 8 g/denier, which fibers are much less expensive than the above-mentioned high performance fibers, while providing adequate tensile strength to resist penetration when constructed, configured, and treated as described herein below. Howland discloses that in one preferred embodiment, polyamide (nylon) fibers are used for forming puncture-resistant fabric layer 12; and in another preferred embodiment, puncture-resistant fabric layer 12 is formed of one of the commercially available types of polyesters having a fiber tenacity of between about 3 and about 8 g/denier.

Thus, following the overall disclosure of Howland. Applicants once again submit that one having ordinary skill in the art would not have any desirability of performing experimentation pertaining to fibers as recited in Applicants' claims to arrive at the subject matter recited in Applicants' claims. In this regard, following the disclosure of lowland, Applicants submit that one having ordinary skill in the art would have performed experiments with the commercially available polyesters having a fiber tenacity of between about 3 and about 8 g/denier. Accordingly, multifilament threads of more than 30 polyester/polyarylate filaments as recited in Applicants' claims would not have been be arrived at.

Thus, one having ordinary skill in the art would not have arrived at a bicycle tire comprising a carcass; a tread rubber; one reinforcement layer in the tire, the one reinforcement

layer containing strength supports comprising multifilament threads of more than 30 polyester/polyarylate filaments and having a fineness of 200 to 950 dtex, the filaments being spun from molten liquid-crystal polymer, arranged between the carcass and the tread rubber and/or between carcass layers below the tread rubber and/or within the tread rubber; and the multifilament threads being present in the one reinforcement layer as threads running parallel to one another and not intersecting with a thread count of 130 to 480 threads per 10 cm.

Regarding Kazusa, Applicants once again note that the Kazusa is prior to the development of Vectran®, and refers to the position of the break-down protection between the carcass layers. Applicants submit that any modification of Kazusa with Howland would involve the preferred embodiment of Howland. Therefore, if for the sake of argument the disclosures of Kazusa and Howland were combined, any such combination would include a layer containing fibers directed to preferred embodiments of Howland.

Therefore, any combination of Kazusa and Howland, would not arrive at a bicycle tire comprising a carcass; a tread rubber; one reinforcement layer in the tire, the one reinforcement layer containing strength supports comprising multifilament threads of more than 30 polyester/polyarylate filaments and having a fineness of 200 to 950 dtex, the filaments being spun from molten liquid-crystal polymer, arranged between the carcass and the tread rubber and/or between carcass layers below the tread rubber and/or within the tread rubber; and the multifilament threads being present in the one reinforcement layer as threads running parallel to one another and not intersecting with a thread count of 130 to 480 threads per 10 cm.

Miyamoto is used in the rejection of claims 6, 18 and 21-26 to try and overcome deficiencies of the combination of references, but does not make up for the deficiencies of Kazusa, Howland, Tyobo and Loose.

Miyamoto discloses a "steel cord ply", which means that it is especially for PLT or CVT tires, not for bicycle tires. The usage of steel cord in bicycle tires would cause too many problems (weight, rolling resistance, etc). This is commonly known and one having ordinary skill in the art would not look to disclosure pertaining to such steel cord tires for bicycle tires.

Still further, it appears that the breaker of Miyamoto is composed of a mixed fabric of Aramide/Nylon or of single threads of Aramide and Nylon (both polyamides). Miyamoto does not appear to provide any teaching or suggestion of polyester or molten liquid-crystal polyaromatic polyester.

Additionally, the rejection does not address Applicants' claimed subject matter of wherein the multifilament threads are arranged at an angle of 40 to 50° to the tire circumferential direction and crosswise to the multifilament threads of a fabric layer beneath. For example, the rejection refers to "inclined between 20 and 50 degrees with respect to the tire circumferential direction".

Moreover, Miyamoto does not appear to include the subject matter indicated to be rendered obvious by its disclosure.

Accordingly, if the rejection is maintained, the Examiner is respectfully requested to indicate how the claimed subject matter is rendered oblivious of any combination of Miyamoto, including reference to the specific disclosure of Miyamoto being relied upon.

Moreover, as noted above, Applicants' claimed combination of features provides surprisingly high puncture resistance with low weight and rolling resistance.

Moreover, the dependent claims are patentable for the reasons set forth above as well as for the combination of features recited in the dependent claims, including the features included in

newly presented dependent claims 27-32 which provide advantageous results as disclosed in Applicants' specification, such as, at page 3, lines 8-12.

Therefore, the rejections of record should be withdrawn for each of the pending claims, and each of the pending claims indicated to be allowable over the prior art of record.

CONCLUSION

In view of the foregoing, the Examiner is respectfully requested to reconsider and withdraw the rejections of record, and allow each of the pending claims.

Applicants therefore respectfully request that an early indication of allowance of the application be indicated by the mailing of the Notices of Allowance and Allowability.

Should the Examiner have any questions regarding this application, the Examiner is invited to contact the undersigned at the below-listed telephone number.

Respectfully submitted,
Wolfgang KLAPP et al.

Neil F. Greenblum
Reg. No. 28,394

Arnold Turk
Reg. No. 33094

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GREENBLUM & BERNSTEIN, P.L.C.
1950 Roland Clarke Place
Reston, VA 20191
(703) 716-1191